SpecTRM Product Documentation

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What it is: SpecTRM is a system development environment with particular emphasis on mission-critical and safety-critical systems. SpecTRM facilitates the construction of software requirements models that can be simulated and analyzed.

Features: SpecTRM provides a user-friendly editing environment for recording system-level requirements and design and blackbox software requirements models. Hyperlinks in SpecTRM ensure traceability of safety information and design rationale from the system level through component development. The SpecTRM requirements modeling language enables model-based engineering. SpecTRM strongly encourages requirements completeness and provides static analyses for completeness checking. SpecTRM provides a simulator for executing requirements models, allowing observation of software behavior at the requirements level. SpecTRM also provides an extension API, allowing users to write plug-ins that extend the tool's functionality.

Benefits: SpecTRM assists in reducing development time and finding errors at the requirements level, where resolving errors is least costly and most effective. SpecTRM facilitates capturing requirements, specifying design rationale, and updating safety information throughout the system life cycle. It helps the engineer build desired properties into the system at the beginning and ensures that those properties are embodied in the design. Reusable components and specifications built with SpecTRM reduce the time required to design new aircraft and spacecraft components. SpecTRM will assist projects in satisfying the new NASA software safety standard.

Successes: SpecTRM was developed from specification and analysis techniques used to develop the official FAA TCAS II specification and validate proposed changes to TCAS over the past 10 years. SpecTRM has been adopted and used extensively by the Japan Manned Space Systems Corporation. Safeware has used SpecTRM to develop and analyze requirements models for systems in the automotive, aerospace, and medical device industries, including an electric steering system for Delphi Automotive. Universities in the United States and Sweden have used SpecTRM's extension API for conducting research in requirements and safety analysis.

Contexts in which it is best used: SpecTRM is intended for use in specifying and analyzing requirements for software-intensive mission-critical and safety-critical systems. Software with complex decision-making algorithms, such as mode and state transition logic, will benefit more than systems where the complexity is in numerical calculations.

Compare with alternative products or technologies: SpecTRM differs from UML modeling tools in that SpecTRM models focus on black box requirements. The design information included in a UML model obscures the requirements information that is pivotal to system and safety engineering. SpecTRM differs from SCR in its emphasis on readability and review by domain experts with only a little training.

What will a successful collaboration look like?

a. **What will the technology provider do?** We will work with you to develop a proposal planning your collaboration. We will provide a 3-day training course at your site and telephone support over the course of the collaboration.
b. **What should the development team do?** Early in the proposal development process, the NASA software development team should communicate with us to determine whether their project is a good fit for SpecTRM. During the collaboration, take the training course; model the software requirements in SpecTRM; and use it to validate the requirements.
c. **How will the technology provider work together with the development team to ensure a successful collaboration?** During the proposal process, we will ensure a good match between the project goals and SpecTRM's capabilities. In addition to providing phone support to the development team, we will proactively contact the Collaboration PoC, obtain feedback, offer suggestions on effectively employing SpecTRM, and follow up to ensure that we are achieving our collaboration goals through SpecTRM's support of the project's goals.